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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Re Application of: )  
Mikhail Tarnopolsky et al. )

Serial No. 10/738,335 )

Filed: December 18, 2003 )

Art Unit 3611

SYSTEM AND METHOD OF GETTING, )  
FOR A BICYCLE AND OTHER PEDAL- )  
DRIVEN VEHICLES, MECHANICAL )  
ENERGY OUTPUT EXCEEDING MUSCULAR )  
ENERGY INPUT, DUE TO )  
GRAVITATIONAL LEVER )  
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**SUBSTITUTION OF SPECIFICATION**

Hon. Commissioner of Patents and Trademarks  
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Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

Dear Sir:

Per your confirmation No. 9609 dated 03/30/04 I enclose the following:

- A substitute specification in double-spaced format;
- Claims in double-spaced format beginning on a separate page with continuing the page numbers from the specification;
- Double-spaced "Abstract" on a separate page.

I enclosed a copy of your Notice and my check for fifty dollars for the fee associated with these matters.

Dated: May 7, 2004

Respectfully submitted,

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Art Unit 3611

In the present invention the same function is carried out by a gravitational lever, as a special part of the pedal, which is powered by gravitational and muscular forces and because of that, it keeps itself vertical during rotation.

An important part of such pedal is the foot straps, as it also supports the combination of power.

Such a system, having a pedal with a gravitational lever, works more reliably and economically, especially when the speed of rotation and centrifugal forces are increasing.

The transmission of a new speedy bicycle and other pedal-driven vehicles were tested in a laboratory since 1999, after the patent No. 5,921,133 was published.

The positive results are the first steps toward large-scale production of new pedal-driven vehicles.

### **SUMMARY OF THE INVENTION**

Accordingly, it is an object of the present invention to provide a new System and Method of getting, for a bicycle and other pedal-driven vehicles, mechanical energy output exceeding muscular energy input, due to the gravitational Lever.

In keeping with these objectives and with others, which will become apparent hereinafter, one feature of the present invention resides, briefly stated, in a system and method of getting, for a bicycle and other pedal-driven vehicles, mechanical energy output exceeding muscular energy input, which have a first rotatable unbalanced element, as a receiver of power from two different sources of energy, such as a foot's muscular energy and gravitational energy of its unbalanced part, which converts that energy into mechanical energy for transmission of the driving power, via a second one-way rotatable element and a third opposing rotatable element,

to a driving sprocket of a vehicle, which is fixed to a third element and freely rotates with it on a crank's axle, for transmission of the driving power, via the chain to a freewheel and then to a drive wheel of the vehicle, where it is in the course of normal forward motion from the pedals. The first rotatable element being connected to a fourth rotatable element by means of a rotatable axle, rotates clockwise together with the fourth element around the fourth element axle and at the same time rotates counter-clockwise around its own geometric axle of rotation, together with a real axle, which is connecting both rotating elements to each other, while the second rotatable element, being connected to the first rotatable element by means of an overrunning clutch and to the third rotatable element by means of toothing, rotates clockwise around the third and fourth element's geometric axle and at the same time the second element rotates counter-clockwise around its own axle of rotation and due to that, makes the third element, as well as a driving sprocket of a vehicle, rotate faster than usual, than when the driving sprocket rotates together with a crank's axle under the same equal condition, and this proves that output energy in such a system exceeds the input energy.

The method of the invention includes the steps of interaction between four rotatable elements, which are powered by two different sources of energy, such as foot muscular energy and gravitational energy and, due to that provides mechanical energy output exceeding muscular energy input.

The invention itself, however, both as to its construction and as to its manner of operation, will be best understood from the following description of a preferred embodiment, which is accompanied by the following drawings.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

Fig.1 is a top view of a schematic representation of a System and method of getting, for a bicycle and other pedal-driven vehicles, mechanical energy output exceeding muscular energy input due to the gravitational Lever.

Fig.2 is a view according to the arrow "A" of the System shown in Fig.1.

Fig.3 is a view according to the arrow "B" of the System shown in Fig.1.

## **DESCRIPTION OF A PREFERRED EMBODIMENT**

A system of getting, for a bicycle and other pedal-driven vehicles, mechanical energy output exceeding muscular energy input has two rotatable parts, one of which is placed on a crank's axle "I-I" for a free rotation on it, while the other part is placed on a crank's axle for a rotation with it.

The first one includes driving sprocket of a vehicle, which is fixed to a disk 5, having a chain periphery 6 [Fig.1].

The second part [Fig.1] includes crank 8 and all details, which are connecting with it: pedal 1, an axle 2, sprocket 4, combined with overrunning clutch 3 and bearing 5.

The pedal 1 performs three functions:

- Getting power from two different sources of energy, such as a foot muscular energy and a gravitational energy of the unbalanced mass, which are, by means of this pedal convert themselves into mechanical energy;
- Transmission of the driving power via the rotating axle 2, overrunning clutch 3, sprocket 4, and chain periphery 6 of disk 5, to the driving sprocket and then to a freewheel and driving wheel of a vehicle;

- Transmission of the driving power straight on the driving sprocket of a vehicle without kinematic interaction between sprocket 4 and chain periphery 6 of a disk 5, as a kinematic couple

[Fig.1], [Fig. 2]

A section of a pedal 1 has a contour of a spherical sector as shown in [Fig. 3].

Practically such design is a gravitational lever, which is in combination with a pedal strap 7 provide vertical position of the pedal 1 during its rotation together with the axle 2 around the crank's axle "I-I" and its own geometric axle of rotation "II-II". It means that in the course of normal forward motion of the pedals, they are rotating clockwise around axle "I-I" and at the same time they are rotating counter clockwise around its geometric axle of rotation "II-II".

The sprocket 4 is powered by gravity weight of "GL" as an unbalanced part of a pedal 1 and by foot muscular force, which is supported also by strap 7 and rotates counter-clockwise, while disk 5 with a chain periphery 6 rotates clockwise, the same way as a pedal, but faster than pedal 1 itself.

The kinematic relations between the sprocket 4 and chain periphery 6 of a disk 5 is as follows: during one revolution disk 5 with a driving sprocket outstrips the crank 8 with a pedal 1 for one radius of the disk 5 because the length of a circle of the sprocket 4 is equal to the radius of disk 5 with a chain periphery (according to a working model).

Unbalanced part of a pedal 1 starts make an additional turn of the disk 5 ( and same of the driving sprocket) during a ride, and this proves that the output energy in such a system exceeds the input energy.

The application is not limited to the details shown, since various modifications and changes are possible, without changing the patent in any way from the spirit of the invention.

What is desired to be protected by a Patent Letter is a set of five in the appended claims.